REPORT

to the

Honorable Board of Directors

of the

Santa Clara Valley Water Conservation District

on

1934 WELL REPLENISHMENT PROJECT

Including

1931 WASTE WATER SALVAGE REPORT

APPENDIX I

Project Report No. 17,

May 8, 1934.

Vol. 3. Pg. 825. 829

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Mem. Am. Soc. of Civil Engs. Mem. Am. Inst. of Elec. Engs.

FRED H. TIBBETTS

Civil and Consulting Engineer

Alaska Commercial Building

San Francisco, Calif.

SUBJECT: SANTA CLARA VALLEY WATER CONSERVATION DISTRICT 1934 WELL REPLENISHMENT PROJECT

May 8, 1934.

Hon. Board of Directors,
Santa Clara Valley Water Conservation District,
95 Grant Building,
San Jose, California.

Gentlemen:

INSTRUCTIONS OF BOARD

As instructed by resolution of your Honorable Board of April 17, 1934, this report has been prepared and is hereby presented to you showing the works to be constructed and property to be acquired, convenient or necessary to serve and fulfill the purposes for which the District exists.

This report includes only such works as seem economically justified at the present time for salvaging waste water individually from each of the main streams entering the District. It does not include works formerly proposed for the conveyance of surplus waters from one watershed to another, particularly from the Coyote River watershed to the northwestern portion of the District.

WASTE WATER SALVAGE REPORT OF 1931

This report is based upon a "Report on Waste Water Salvage Project to Board of Directors, Santa Clara Valley Water Conservation District, San Jose, California, by Fred H. Tibbetts, Civil Engineer, San Francisco," with an introduction by Leroy Anderson, President, the financing plan by Herbert C. Jones, Attorney, and a review by Harry L. Hachl, Consulting Engineer, San Francisco, dated October 2, 1931. Said report is hereby referred to, and by this reference incorporated herein. Said report will be hereinafter referred to as the "Waste Water Salvage Report."

MODIFICATIONS OF "WASTE WATER SALVAGE" PROJECT

Such works as are recommended in this report for immediate construction have been adopted without material change in proposed design from the "Waste Water Salvage Report" with the exception of the Coyote Reservoir and dam. From the original project there has been eliminated the small mountain check dams formerly proposed on Page 58 of the "Waste Water Salvage Report" at the estimated cost of $121,000. The present project, as heretofore stated, does not include works formerly proposed for the conveyance of surplus waters from one watershed to another, particularly the marginal canals and power plant as formerly proposed on pages 45, 46 and 47 of the "Waste Water Salvage Report". The percolating reservoirs listed in the "Waste Water Salvage Report" (Table 13, Page 68) on the Guadalupe, Los Gatos and Stevens Creeks at the crossing of the then proposed main marginal distribution canal were formerly intended to function as canal crossings of the streams as noted in the footnote of said Table 13. With the elimination of the canal, the creek crossing provisions of those dams have also been eliminated.

The present project includes the same "Spreading Dams" (wire "sausage" type) and "Percolating Reservoirs" (Reinforced concrete structures of the general type shown on Page 63 of the "Waste Water Salvage Report" and recently built by the District on the Coyote and Los Gatos Creeks) described in Tables 12 and 13, Pages 67 and 68 of the "Waste Water Salvage Report", except completed features or new features as follows:

Penitencia Creek:

"Old Wells and Tunnels", Table 13, Page 68, "Waste Water Salvage Report", estimated cost $1,200. Completed.

Los Gatos Creek—Page Dam:

Table 13, Page 68, "Waste Water Salvage Report". One of the three structures contemplated is now under construction and will presently be completed. The present project now includes streambed improvements on the Los Gatos Creek consisting of two or more concrete check dams similar to the Page Dam, and 6,150 lineal feet of "Sausage Type" wire spreading dams as compared with 2,000 feet proposed in Table 12, Page 67, of the "Waste Water Salvage Report". In addition to this the Vasona Canal as hereinafter described in detail has been added to the proposed Los Gatos Creek project.

Calabazas Creek:

Table 13, Page 68, "Waste Water Salvage Report". One of the two dams proposed has been constructed and the other one is still to be built under the present project.

Campbell Creek, San Tomas Creek, Stevens Creek and Penitencia Creek:

Construction proposed in this report is identical with that of the "Waste Water Salvage Report", Tables 12 and 13, Pages 67 and 68 thereof.

Guadalupe and Almaden Creeks:

Percolating reservoir proposed in Table 13, Page 68, "Waste Water Salvage Report" to function principally as canal crossing is eliminated. The percolating dams required, three in number, have been completed by the District in 1932, 1933 and 1934.

Vasona Canal:

In order to give additional service to the Campbell area there has been added to the "Waste Water Salvage Project" the "Vasona Canal" with a capacity of 75 sec. ft. from the Vasona Reservoir on the Los Gatos Creek to Quito Road. This canal would lead from Vasona dam and would follow along the base of the hills for about 4 miles to and across the Quito Road. It would be an earth canal, unlined, about 15 ft. wide on top and 4 ft. deep of the general type of construction shown on Page 49 of the "Waste Water Salvage Report". Concrete checks and turnouts would be provided to enable the diversion of water to any suitable percolating areas along the route of the canal.

After all prior ditch and pumping water rights on the Los Gatos Creek have been satisfied, it will be possible, by means of this new Vasona Canal to divert additional flood waters of the Los Gatos Creek into percolating areas along this canal or in the water ways below, thus salvaging additional flood waters from the Los Gatos Creek which would otherwise run to waste in the Bay.

As portions of the proposed streambed improvements of the "Waste Water Salvage Report" project have already been completed and at costs about three-fourths of those estimated, it is clear that sufficient funds will be available out of amounts budgeted for streambed improvements, particularly on the Los Gatos and Campbell Creeks, to include the estimated cost of $44,000.00 for this Vasona Canal.

Other than the exceptions herein noted, the works proposed in the present report are identical with those described in more detail in the "Waste Water Salvage Report" of October 2, 1931.

COYOTE RIVER

Water Requirements: Coyote Valley

The elimination from the works formerly proposed in the "Waste Water Salvage Report" of provisions for transferring excess surplus Coyote River water to the northwest side of the District have reduced the economic capacity of reservoir development on the Coyote River from the 60,000 acre feet formerly proposed to 30,000 acre feet. This reduced capacity will conserve sufficient water to more than equalize the overdraft in the Coyote Basin. The normal requirement for the Coyote Basin (see "Waste Water Salvage Report," page 42) as fixed by court decree in the Hayes-Chynoweth vs. Bay City Water Case, is 18,800 acre feet annually. The Report of the State Division of Water Resources, Bulletin 42, Page 42, estimates that with 30,000 acre feet of surface storage on the Coyote (the amount proposed in the present project) the average annual waste conserved would "vary between 21,700 acre feet and 25,800 acre feet".

This same State Report (Bulletin No. 42 of the Division of Water Resources—1933) estimates on Page 39 that the average normal contribution of the Coyote to ground water storage approximates 23,000 acre feet per annum. It will thus be seen from the measurements of the State Division of Water Resources that with the reservoir here proposed in operation the Coyote Valley would during periods of normal rainfall receive more than twice the amount of water required to maintain well levels. The wells in this portion of the Valley should rise rapidly; five to ten feet or more per year. This portion of the underground storage basin of the Valley should soon begin to overflow into the main underground pool toward the west tending to check the decline of the water plane in that area immediately and to assist in its recovery later. The Division of Water Resources found (Page 39, Bulletin No. 42), an absorption capacity of the Coyote River

reaching 153 sec. ft. or over 300 ac. ft. per day "at fairly low stages." Such an "absorption capacity" would enable the 30,000 ac. ft. reservoir when filled with "detained flood water" to be emptied into underground storage in 100 days.

The new percolating reservoir constructed by the District in the fall of 1933, just below the Metcalf Road, showed a measured absorption rate, after it had been in operation for several days, of about 100 ac. ft. per day. The rate of absorption was about the same as measured by the State Engineer at the same location. This would indicate that this new percolating reservoir alone would be capable of passing into underground storage the 30,000 ac. ft. of stored "detained flood water" in 300 days. It should be noted that the reservoir releases would be desilted; i. e., clear water which should be absorbed more rapidly than the natural somewhat turbid flow.

Actual measurements by the U. S. Geological Survey during the 1931-1932 season showed the natural absorptions of the Coyote to have been over 11,000 ac. ft. in about 52 days of runoff.

THE DOMINANT FEATURE OF THIS ENTIRE PROJECT AND OF THE COYOTE RESERVOIR, AS WELL AS OF THE OTHER RESERVOIRS, IS THE DETENTION OF FLOOD WATER WHICH WOULD OTHERWISE RUN TO WASTE, AND THE GRADUAL RELEASES OF SUCH FLOOD WATER INTO NATURAL STREAMS AT A RATE SO REDUCED THAT IT WOULD BE ENTIRELY ABSORBED IN THE NATURAL STREAMBEDS AS RELEASED AND PASSED INTO UNDERGROUND STORAGE.

The streams provided with detention reservoirs would have their period of flow prolonged from the natural flow of a few weeks to an artificially controlled flow of more than as many months and spreading out through the entire year if necessary. There is no doubt whatever that the streams could absorb, in this manner, all of the detained reservoired flood water.

Upper Site, Rock Fill Dam

The 1921 report of Tibbetts & Kieffer, on "Santa Clara Valley Water Conservation Project" shows on page 156-7 the topography of the upper Coyote Reservoir site and dam site and indicates the general design of a rock fill dam for that location, and this is the kind of structure proposed in the present project, as shown in Plates I and II herein.

The writer has recently carefully re-examined this dam site and the material available for the construction of a dam. Recent construction costs for this type of dam have been low, particularly at the San Gabriel dam now under construction in Southern California.

Coyote Canal

The present project includes a canal of 100 sec. ft. capacity, about 9 miles long to convey reservoir releases from the Upper to the Lower Gorge of the Coyote. This canal would parallel the river on the east or right bank from the mouth of the canyon to a point near the District's new percolating reservoir which is the most favorable point in the entire river to start distributing thru underground channels. The canal would be unlined, in earth about 18 ft. wide on top and 4 ft. deep. It would be headed by a concrete weir diversion dam. This canal is desirable as first recommended by Consulting Engineer Harry L. Haehl to prevent the escape of reservoir releases south of the District and to prevent possible waterlogging of land between Morgan Hill and Coyote.

PUBLIC WORKS ADMINISTRATION ASSISTANCE

Financial assistance from the Federal Emergency Public Works Administration to the extent of $683,000, as an outright contribution from the Public Works fund of 30% of the cost of labor and materials, is now practically assured; this assistance having been applied for by the Board of Directors on November 7, 1933, and becoming finally assured through the active co-operation of various public bodies in Santa Clara Valley, the determined support of congressional representatives, particularly Congressman McGrath and Senator Johnson, and the tireless efforts in Washington, D. C. for some weeks of Mr. John D. Crummey, Chairman of the Citizens Committee working for the project.

This project is peculiarly adapted to receive such assistance. The National Industrial Recovery Act, Title II, Public Works and Construction Projects, Section 202, sub-section (b) mentions first as projects meriting Federal help the "conservation and development of natural resources, including the control and utilization******of water."

The primary object of the National Industrial Recovery Act, Title II, Public Works and Construction Projects, is the relief of unemployment. The Public Works Administration places the greatest emphasis upon the immediate relief of unemployment. The Project herein recommended is peculiarly adapted to this purpose. The preliminary plans and surveys have already been worked out by the District's Engineer and approved as shown in the "Waste Water Salvage Report" by Harry L. Haehl, eminently qualified Consulting Engineer. Detailed working plans and drawings have been prepared during the last year for typical streambed improvement works such as the "sausage dams" constructed on the Almaden and Guadalupe Creeks, and the "percolating dams," one of which is under construction on the Los Gatos Creek (Page Dam), and one of which was completed on the Coyote River last fall. It should be noted that both of these structures will cost materially less than the amounts provided in the estimates of the present projects and approved by the Government Engineers of the Public Works Administration.

ACTUAL IMMEDIATE CONSTRUCTION POSSIBLE

Actual construction work on the streambed improvements could start within three weeks of the time that money was available.

It might be possible to actually start the construction of the Coyote Reservoir, the largest individual item of the project, within a very short time as it is understood that the District can at once purchase the lands required. A rock-fill type of dam is proposed for this structure. Unless unexpected difficulties are incurred, the working plans for such a structure could be produced in a minimum of time and could be promptly approved by the State Engineer, in which case actual construction could start during the coming summer. This would mean the employment directly on the project as shown on page 35 of the District's application to the Public Works Administration during the slack winter season of from 800 to 900 men.

COMPARISON OF WASTE WATER SALVAGE (1931) REPORT and WELL REPLENISHMENT (1934) PROJECT

As plans and drawings for most of the structures herein proposed are described by reference to the "Waste Water Salvage Project", it will give a clearer understanding if a brief comparison is made between works proposed in that report and those in the present report.

"WASTE WATER SALVAGE REPORT" OF 1931	PRESENT REPORT "WELL REPLENISHMENT PROJECT OF 1934"
Item 1. Detention Reservoirs, including Dams, Outlets, Spillways, Lands and Improvements and Overhead Expenses.	
Shown in detail in table at bottom of Page 69 at estimated cost of $3,607,200.	Works proposed identical with two exceptions: First, Coyote Reservoir reduced in size from 60,000 to 30,000 ac. ft. and now located on the southern branch of the river, controlling about two-thirds of the water supply. Estimated cost of the Coyote Reservoir reduced from $1,964,400 to $631,000. Second, Guadalupe Percolating Dam omitted as hereinbefore described.
Item 2. Distribution System	
Shown in detail in Table at top of Page 70, "Waste Water Salvage Report" at an estimated cost of $1,026,500.	All items in "Waste Water Salvage Report" distribution system eliminated and replaced by Coyote By-Pass Canal at an estimated cost of $50,000 and Vasona Canal from the Los Gatos, at an estimated cost of $44,000 both as hereinbefore described.
Item 3. Power Development	
Detailed estimate on Page 70, "Waste Water Salvage Report".	Completely eliminated.
Item 4. Percolating Reservoirs, (reinforced concrete structures of the type recently built by the District on the Coyote River and now building (Page Dam) on the Los Gatos).	
Estimates in detail Table 13, Page 68, "Waste Water Salvage Report".	Present project includes the same identical structures with the following exceptions as hereinbefore described: **Penitencia Creek**—Old well and tunnels eliminated (already complete). **Guadalupe Creek**—Percolation dam eliminated. **Los Gatos Creek**—Page Dam eliminated (under construction). **Calabazas Creek**—One of the two dams eliminated (constructed).
Item 5. Spreading Dams (wire sausage dam construction).	
Cost estimates shown in detail on Page 67, Table 12, "Waste Water Salvage Report".	Identical construction proposed herein.

SUMMARY OF RECOMMENDED CONSTRUCTION FOR MAXIMUM ECONOMIC INDIVIDUAL STREAM DEVELOPMENT

Table I herewith shows a summary of the construction works recommended for each of the ten main streams of the Valley with the total cost of the proposed works on each stream.

The results to be expected from conservation works on each stream are of course not confined to the natural watershed of that stream, especially on the valley floor, i. e., within the boundary lines of the District. Additional induced streambed percolation on the Coyote, for example, will directly benefit most of the lands adjacent to the Penitencia Creek and in addition will probably affect immediately all of the large area formerly artesian, i. e., from the Bay southward to Santa Clara and southwestward to Mountain View. In time it will also beneficially affect the western portion of the Valley by eliminating the draft from the insufficient underflow in the western portion of the Valley into the area formerly artesian. Similarly overlapping benefits will come in time from water conservation on the Guadalupe:—for example, in the Campbell and Cupertino areas where the water level has dropped the farthest.

COST ESTIMATES

The cost estimates of such works as are here proposed have again been carefully reviewed. Changes in unit costs have been based upon contract bids recently received by the Santa Clara Valley Water Conservation District for construction work in Santa Clara Valley and upon the increased labor costs resulting from the N. R. A. schedule for work under Public Works Administration financing as shown in following tables:



SANTA CLARA VALLEY WATER CONSERVATION DISTRICT
1934 WELL REPLENISHMENT PROJECT

SUMMARY OF CONSTRUCTION COSTS ON TEN INDIVIDUAL STREAMS

Stream	Detention Reservoirs	Percolating Reservoirs	Spreading Dams	Canals and Tunnels	Rights of Way	Total
Coyote	$ 512,000	$	$	$ 46,000	$ 73,000	$ 631,000
Calero Res.	339,000				50,000	389,000
Almaden Res.	214,000				23,000	237,000
Almaden-Calero Conduit				241,000	2,000	243,000
Guadalupe	330,000				20,000	350,000
Stevens	412,000	8,000			59,000	479,000
Penitencia			3,000		7,000	10,000
Los Gatos		144,000	39,000	37,000	57,000	277,000
Campbell		25,000	14,000		5,000	44,000
San Tomas		2,000	1,000			3,000
Calabazas		4,000				4,000
Permanente		15,000	1,000			16,000
TOTALS	$1,807,000	$198,000	$58,000	$324,000	$296,000	$2,683,000

I recommend the immediate undertaking of the construction works at the estimated costs shown in the above table.

Respectfully submitted,

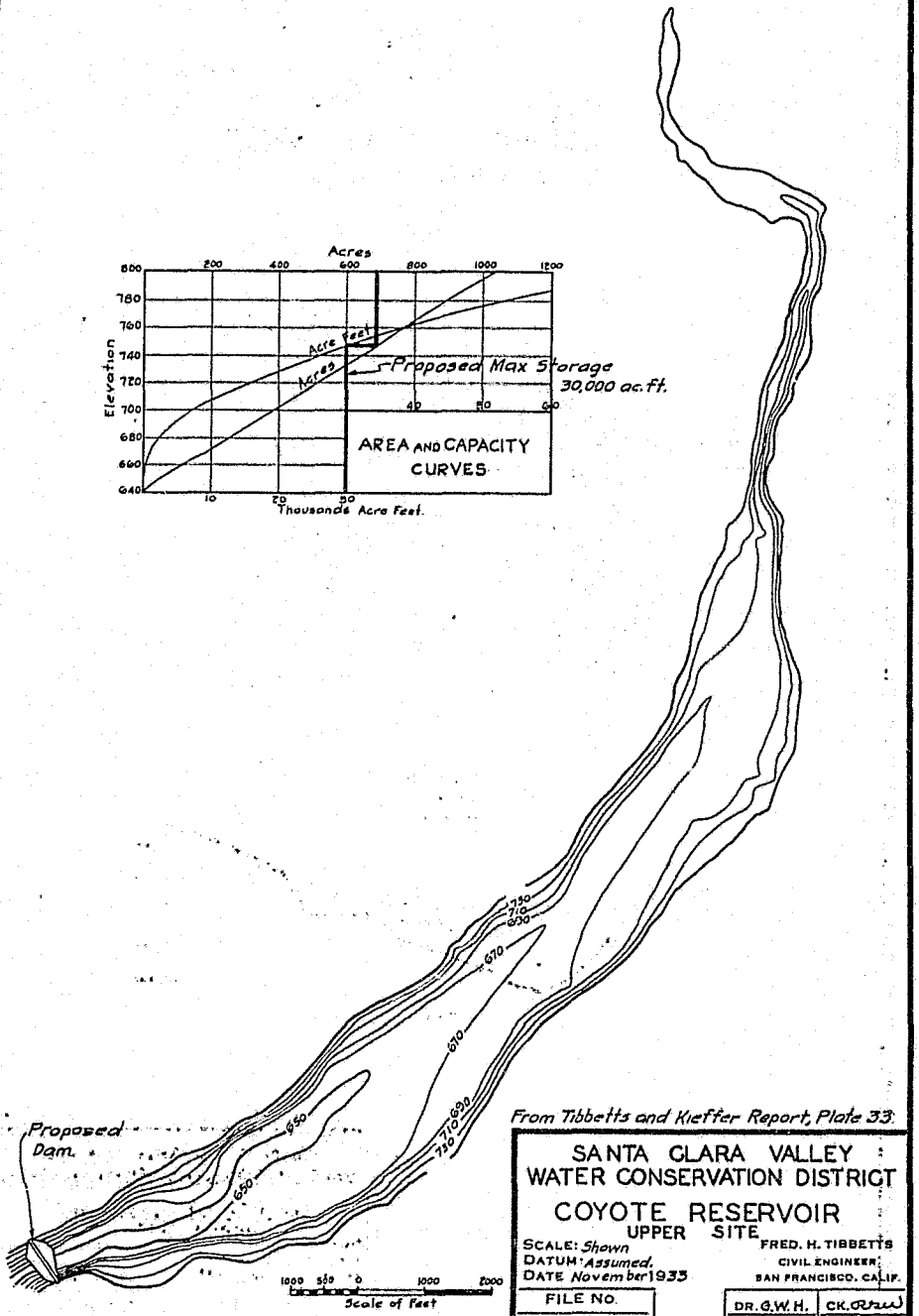
FRED H. TIBBETTS,
Chief Engineer,
SANTA CLARA VALLEY WATER CONSERVATION DISTRICT.

The above report was officially approved and adopted by the Board of Directors by resolution adopted May 8, 1934.

SIDNEY D. FARRINGTON
WM. F. NOETHIG
R. P. VAN ORDEN
J. FRED HOLTHOUSE
RALPH F. SIMONS
REGINALD L. PARRY
C. D. CAVALLARO

Board of Directors

ATTEST: Leroy Anderson, Secretary.



From Tibbetts and Kiefter Report, Plate 33.

SANTA CLARA VALLEY
WATER CONSERVATION DISTRICT

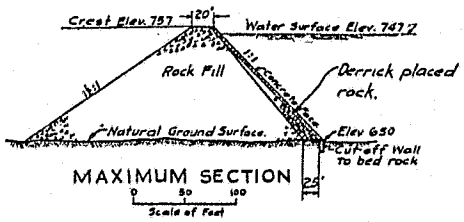
COYOTE RESERVOIR
UPPER SITE

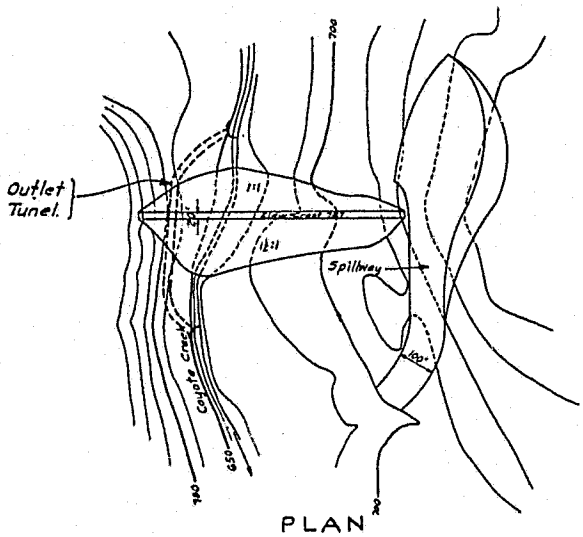
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DATUM: Assumed.
DATE November 1933

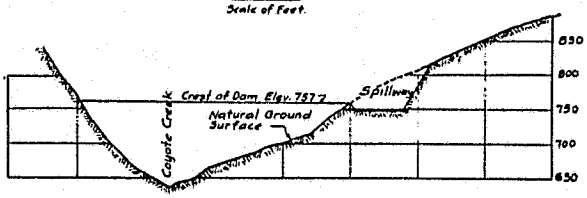
FRED. H. TIBBETTS
CIVIL ENGINEER
SAN FRANCISCO, CALIF.

FILE NO.
1933-27

DR. G.W.H.	CK.
TR. L.K.P.	AR.







PROFILE

From Tibbetts and Kieffer Report, Plate 34

SANTA CLARA VALLEY
WATER CONSERVATION DISTRICT

COYOTE RESERVOIR
UPPER SITE

SCALE: Shown
DATUM: Assumed
DATE November 1933

FRED. H. TIBBETTS
CIVIL ENGINEER
SAN FRANCISCO, CALIF.

FILE NO.	DR. G.W.H	CK.
1933-28	TR. L.K.P.	AP.

1934 WELL REPLENISHMENT REPORT PLATE 2

Statement by
General Water Advisory Committees

The undersigned Citizens' Committee was appointed by civic bodies of San Jose at the request of the undersigned Farmers' Committee to cooperate in an investigation of the water situation in Santa Clara County and to formulate a plan of action.

We found a very alarming situation.

The very life of the County is dependent upon its water supply from wells. These wells have dropped approximately 116 feet in the past 20 years. Of this drop, due to increased use and decreased supply of water, 21 feet occurred last year.

Many wells are dry, hundreds are being deepened with consequent expenditures for wells, pumps, and electric current that put our fruit and produce growers at a disadvantage in cost with other districts, and greatly reduce purchasing power in the community.

This rapid depletion of our water supply has for the first time lowered our wells to such a point that the wells in over 50 per cent of the District were standing (Dec. 31, 1933) below sea level! We thus are inviting salt water seepage that will be permanently ruinous wherever it occurs.

We have, therefore, been forced to the conclusion that as a community we have been unaware of impending disaster and must seek an immediate remedy. Accordingly, after receiving approval from many organizations over the County, we petitioned the Board of Directors of the Santa Clara Valley Water Conservation District to call an election on a modified plan contingent upon securing an outright gift of 30% of the entire cost of all labor and materials from the Public Works Administration.

Fortunately, we have the water available at our very doors; but imagine, we now let it WASTE INTO THE BAY!! Most of us see these stream beds dry eleven and a fraction months each year and fail to realize the immense amount of water which flows to waste during a few stormy days. This waste has been accurately measured by the U. S. Geological Survey and also by State Engineers for many years. There are dry years and wet years, but the average waste into the bay exceeds our annual water depletion two and one-half times. (Enough to cover all the farms in our District with one foot of water.)

We must conserve this waste water. The plan is simple—five detention reservoirs, with stream bed work in all ten streams that will aid nature in extending over months the percolation which now occurs during only a few days or weeks. The plan has the unanimous approval of engineers here and elsewhere. It has been used successfully throughout Southern California for many years.

The cost is very light because it is spread over 130,000 acres of this great Valley, in country, town, and city.

The 1931 plan provided features which have been eliminated by this plan. The 1931 plan required Six Million Dollars in bonds; this one, Two Million. Interest was then 6%, now not over 4½%. Interest alone on the

(over)

Six Millions was $360,000 the first year, which is 2¼ times the first year's cost of both interest and principal payments under this plan. Yet, with the exception of 30,000 acre feet in the Coyote, we save all the water in all 10 streams contemplated in the 1931 plan!

This project will continue its benefits to our children, and the bonds run 25 years. The annual principal payment is $80,000 and the average interest payment is $40,000, or a total of $120,000. The assessed valuation of land only (improvements and personal property are not taxable for this purpose) will average $40,000,000. Therefore, this work will require an average tax rate of 30c per $100 of assessed valuation (on land only), (40c the first year).

An average acre of land also an average city lot, is assessed for about $250, on which the average tax would be 75c per year ($1.00 the first year). We feel sure that every family in our County, who understands this threatened danger and the wasteful expense resulting from water shortage, will gladly vote to pay 50c to $1.00 per lot or per acre per year to save this waste water.

The price that we are paying for our delay is appalling. Engineers estimate that pumping charges are $800,000 a year greater than they would have been if the water table were at its 1915 level. It is further estimated that we have spent more than $10,000,000, merely because of the falling of the water table, in deepening our wells, buying new equipment, and sinking new wells to replace those that have gone dry. Even this vast expenditure may count for nothing if we allow the water table to still further recede, because we fail to stop our flood waters wasting into the Bay.

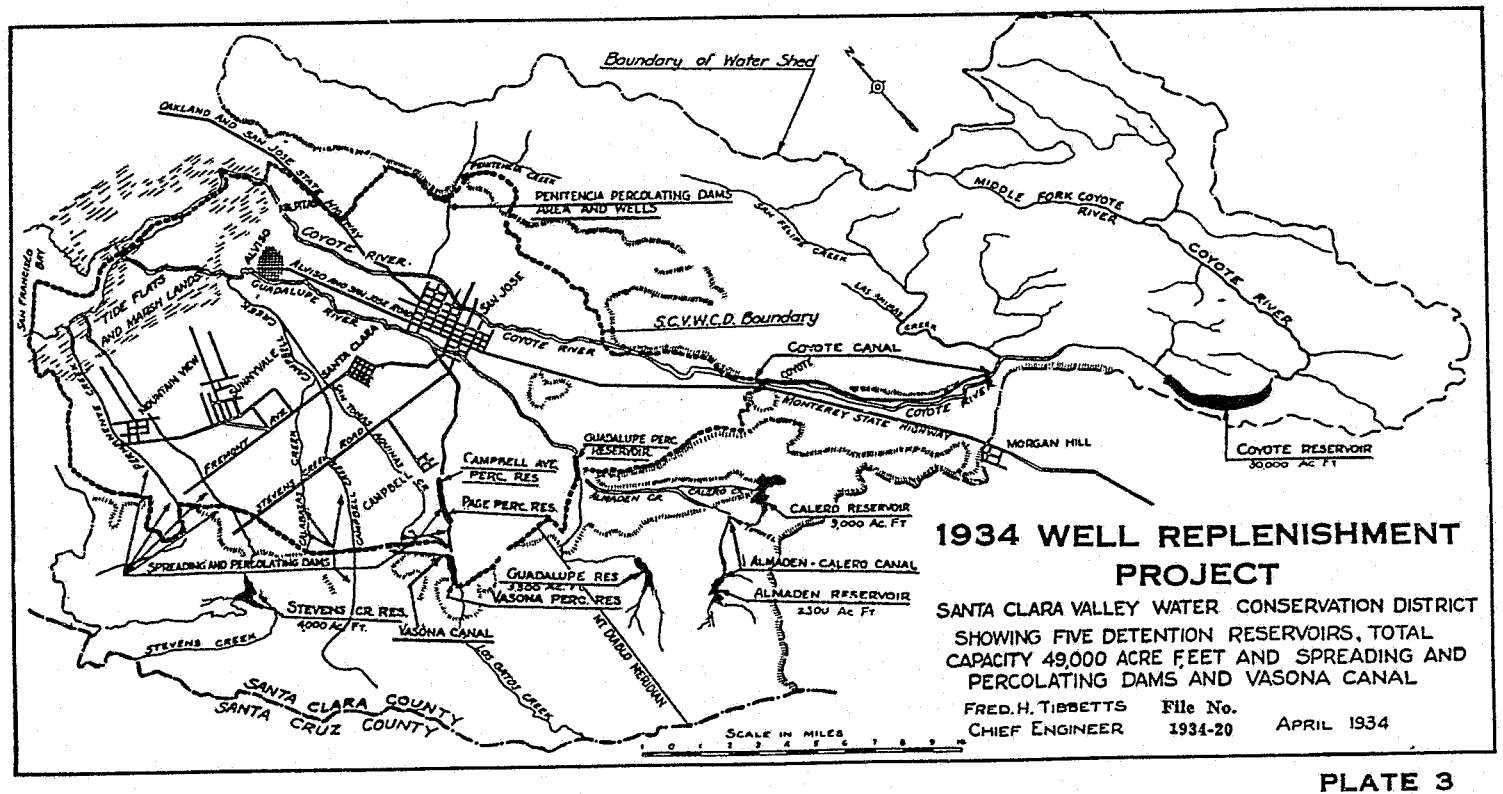
For the sake of the general good and our own welfare let us do this very necessary job now while we can secure a gift from Uncle Sam of about $700,000, a low interest rate, and keep 800 to 900 men busy all next winter.

SAN JOSE CITIZENS' COMMITTEE:

R. H. Borchers
John D. Crummey (Ch.)
E. N. Curtis
John S. Williams, Sr.

FARMERS' COMMITTEE:

W. W. Lester
Nick Nelson
Clarence L. Rich (Ch.)



1934 WELL REPLENISHMENT PROJECT

SANTA CLARA VALLEY WATER CONSERVATION DISTRICT

SHOWING FIVE DETENTION RESERVOIRS, TOTAL CAPACITY 49,000 ACRE FEET AND SPREADING AND PERCOLATING DAMS AND VASONA CANAL

FRED. H. TIBBETTS, CHIEF ENGINEER

File No. 1934-20

APRIL 1934

PLATE 3

SANTA CLARA VALLEY
WATER CONSERVATION DISTRICT

BOARD OF DIRECTORS

SIDNEY D. FARRINGTON	Division I
WM. F. NOETHIG	Division II
R. P. VAN ORDEN	Division III
J. FRED HOLTHOUSE	Division IV
RALPH F. SIMONS	Division V
REGINALD L. PARRY	Division VI
C. D. CAVALLARO	Division VII

OFFICERS

REGINALD L. PARRY	President
LEROY ANDERSON	Secretary
HERBERT C. JONES	Attorney
FRED H. TIBBETTS	Chief Engineer